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No. 25

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PHYSICAL SCIENCES

PROGRESS MADE IN STUDY OF POLAROGRAPHIC WAVES OF CATALYSIS

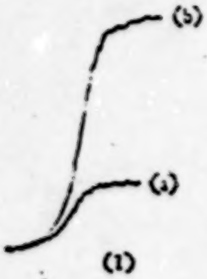
Beijing HUAXUE TONGBAO [Chemistry Bulletin] in Chinese No 4, 23 Jul 79, pp 9-10

[Article by Gao Xiaoxia [1559 1420 7209], Department of Chemistry, Beijing University]

[Text] Now is the time of blossoming in the area of science in China. This year we welcome the 30th anniversary celebration of our great fatherland and, as scientists, we are indeed delighted. Analysis of polarographic waves of catalysis is a kind of analytic method that has given outstanding results for socialist construction over the last 30 years. In the future it will develop and blossom in theory and in practice to contribute its share in rapidly realizing the Four Modernizations.

Ever since the founding of New China, polarographic analysis has experienced a rapid development, as have other analytic methods. Analytical methods with high sensitivity and selectivity are needed in industry, agriculture and science and technology; workers in polarographic analysis become interested in looking at problems from the chemical point of view in addition to trying to improve their instruments, and therein lies their interest in polarographic waves of catalysis. The so-called catalytic waves are the specially sensitive polarographic waves which are formed by electrical or chemical catalytic reactions at the same time as the electrode reactions. This kind of catalytic waves has had few applications although it had been studied abroad as early as the 1930s. China has developed these polarographic waves of catalysis and in the 1960s has suggested wave forms of catalysis for 10 or 20 different metal ions. Of these, the analytic sensitivities of the waves of catalysis of Mo, Co, Rh, Ir reach 10^{-9} --10^{-11} M. China has had particular success in exploiting applications in such varied fields as mineral ores, metallurgical materials, semiconductors, biochemistry, pharmaceuticals, and environmental.

The reaction mechanisms of waves of catalysis are rather complicated. Several model wave patterns are illustrated in the following diagrams.



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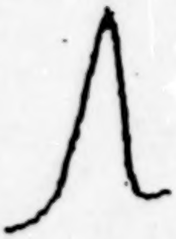

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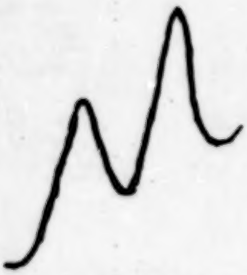

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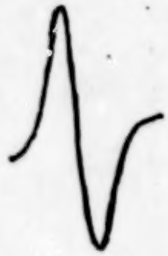

(4)

Diagram (1) is an example of parallel waves of the $Ti(IV)-H_2SO_4-H_2C_2O_4-KClO_3$ system. When the Ti(IV)-oxalic acid complex iron is reduced to a lower valence complex ion on the mercury electrode, it is rapidly oxidized to the former 4 valence complex ion because of the presence of chloric acid radical ions; this brings about parallel cyclic catalytic activity, greatly increasing the polarographic current, as from wave (a) to wave (b) in Diagram (1).

When parallel waves occur and when adsorption of the complex ions of metals occurs on the drip mercury electrode, then ever if peaks similar to that shown in Diagram (2) appears on a direct current polarograph, the analytical sensitivity increases by several orders of magnitude compared to that of ordinary polarographic waves. For example, in the $Mo(VI)-H_2SO_4-CH(OH)COOH-NaClO_3$ system, one can detect Mo as low as 6×10^{-10}M; the result is better than the sensitivity of similar waves of catalysis obtained abroad by applying slightly different quantities of reagents by two orders of magnitude.

Diagram (3) is another kind of sensitive wave of catalysis, called the wave of catalysis of hydrogen or catalytic hydrogen wave. Electrically active complexes are formed by organic compounds containing nitrogen ($-NH_2$ base) or sulfur (-SH base) and are adsorbed on the surface of the drip mercury electrode. Thus the discharge of catalytic H^+ forms the catalytic hydrogen waves. For example in China, the sensitivity of catalytic hydrogen waves in the many different systems of Co(II) and Ni(II) containing dimethylglyoxime, dipyridine, salt of thiocyanate and NH_2OH is high. We can detect Co and Ni as low as 0.001 microgram/milliliter. The sensitivity of the waves of catalysis of the Co(ii)-dimethyl gloyoxime-sodium nitrite-NH_2OH-HCl-NH_4 Cl system is as low as 0.000025 g/ml. These methods are applied in the analysis of minerals, steel, soil and water. Diagram (3) is the wave pattern of Co(II) and Ni(II) in the presence of dipyridyl as shown on the domestically manufactured JP-1A type oscillo-polarograph. The content of both metals can be simultaneously detected if quantities of both are not too far apart.

The waves of catalysis of the six elements of the Pt family has been summarized in the technical work "The Polarographic Waves of the Elements of the Pt Family in Catalysis," (Science Press, 1977). The conditions of the formation of catalytic hydrogen waves of Rh, Ir and Pt and procedures of applications in mineral analysis have been described in detail. This work also probes the structure and reaction mechanism of electrically active complexes. An example is that one can obtain two corresponding and sensitive catalytic hydrogen waves (10^{-9} - 10^{-11} M) in the oscillo-polarograph as shown in Diagram (3). One can also use oscilloscopic derivatives to obtain derivative wave forms as in Diagram (4). Because the method is sensitive, one can take small samples in mineral analysis, for example, a sample of 100 micrograms is easy to handle and requires no separation. In recent years, the wave form in the catalysis of Pd has been discovered in the Pd(ii)-o.1 M NaOH-$1x10^{-3}$ M 1,2-cyclohexane-diketone-dioxime-systems. Its pattern is similar to that shown in Diagram (4) and its capability of detection reaches 5×10^{-8} M. It has been successfully applied in mineral analysis.

Inspired by the research in the waves of catalysis of the Pt family, recently the research units of geology and mineral metallurgy are further investigating polarographic waves of catalysis of rare earth elements. This is a daring attempt to use the selectivity and sensitivity of the waves of catalysis to find sensitive methods of detection of each element. For example, in the base solution to ammonium chloride $C_6H_5NOONH_2$ exists (a copper and iron reagent) and besides Eu, more than 10 rare earth elements all have catalytic peaks of different currents. When scandium is present together with dibenzoguanidine in the above solution, a wave form shown in Diagram (4) can be obtained on the oscillo-polarograph. The lower detection limit is 5×10^{-8} M, with no interference from the other rare earth elements. We preliminarily regard these waves as catalytic hydrogen waves. But due to different conditions in the formation of waves of catalysis, different reaction mechanisms, there is still a need for deeper theoretical studies and more experimental confirmation.

In addition, some metal ions form amalgam with mercury after reduction, generally yielding no waves of catalysis. If metal complex ions possess strong adsorption, they can form sensitive adsorption (catalytic) waves. For example, Pb^{++} and Cd^{++} produce PbI_n^{2-n} and CdI_n^{2-n} complex ions in KI solution, they adsorb and change the zero charge electrical potential of the drip mercury's capillary curve and thus greatly increase the electrode reaction, enabling one to detect Pb^{++} and Cd^{++} to as low as 10^{-7} - 10^{-8} M in the oscillo-polarograph and making it easily applied in health and environmental protection analysis.

The above are only several examples. There are many more waves of catalysis discovered by Chinese researchers, such as Ti, V, Nb, Ta, Cr, W, Mn, Re, Cu, Ag, In, Sn, As, Sb, Se, Te, No_2^-(NO_3^-) and Eu, etc. Most of them have a relatively high sensitivity and actual applicability. Some of them have been used in routine production analysis and among them two or three have been assigned as standard analytic methods for mineral analysis by the Chinese national or regional departments.

The instruments used for waves of catalysis can be an ordinary polarograph, an oscillograph or a square-wave or pulse polarograph, depending on the reaction mechanism. Drip mercury is the commonly used electrode, but one can also generate waves of catalysis on rotating Pt microelectrodes or vitreous carbon electrodes.

Less work has been done in China in using waves of catalysis in biochemical analysis and analysis of organic matter. But efforts and applications have been made in the waves of cobalt salts--protein (serum, amino acid) catalysis in the research of early cancer diagnosis. Also certain success has been obtained in converting serum into urine samples. Work has also been done on polarographic wave analysis of catalysis in amino-rich urine. This has reference value in the early diagnosis of cancer. Since the reaction mechanism of organic waves of catalysis are more complicated, we need to expand research on the basis of deepening theoretical studies.

Reviewing the development of the progress in the study of polarographic waves of catalysis in China in these 30 years, constructive contributions to China have indeed been made. Upon this foundation, we can delve deeply into theory, discover some regular patterns, create new systems of waves of catalysis, and expand their applications. Let us surge ahead and bravely climb the high peaks of polarographic waves of catalysis.

9296
CSO: 4008

SECOND ALL CHINA SYMPOSIUM ON SEMICONDUCTOR PHYSICS HELD IN HEFEI

Beijing GUANGMING RIBAO in Chinese 4 Dec 79 p 2

[Text] A total of 135 representatives from 74 higher educational institutions, scientific research units and industrial departments from throughout the nation recently held the Second National Symposium on Semiconductor Physics in Hefei.

Member of the standing council of the China Physics Society Huang Kun [7806 2492] presided over the opening ceremony. First secretary of the Anhui Province Provincial Committee of the Chinese Communist Party Wan Li [5502 6849], provincial committee secretary Gu Zhuoxin [7357 0587 2450] and Ren Zhigong [0117 0037 1872], the famous physicist and honorary professor of the Chinese University of Science and Technology who is currently visiting and lecturing in our nation were invited to attend the opening ceremony. Internationally renown physicist Fan Xuyun [5400 4872 4596] was invited to attend the symposium and to deliver an academic report. He was welcomed by the participants.

This symposium received a total of 93 papers on basic physics, material physics and instruments physics. The contents included deep energy classes in semiconductors, semiconductors of indefinite shapes, computations of energy bands, semiconductor surfaces, impurities and defects in semiconductors, solid and soluble semiconductors and narrow band semiconductors. In instruments physics, contents included semiconductor microwave instruments, laser instruments and discussion of the many problems of physics in instruments technology. These reflect the emergence of a new face in our nation's research work in semiconductor physics and new progress has been made. The conferees believe our nation's work in semiconductor physics is still not wide enough at present. There are some blanks in some areas and compared to the international level, the distance is still great. To hasten the development of research work in semiconductors, everyone believes: the first endeavor is that research work in semiconductor physics must be further strengthened and the topics now being studied must be studied further and more in depth, and at the same time, those areas in which work is still weak or areas which have not been developed should be developed as fast as possible; the second endeavor is to strengthen construction of modern physics laboratories and along with the gradual profundity of the research work, some modern precision instruments and facilities are necessary and it is hoped that the leadership at each level can pay sufficient attention while at present the existing facilities should be fully utilized and work must be actively developed; the third endeavor is to strengthen exchanges with all our effort, to supplement the shortcomings with the advantages, to provide mutual assistance and mutual stimulation; the fourth endeavor is to strengthen academic exchange, to frequently hold symposiums in special academic fields, conduct summer learning and discussion meetings and academic discussion meetings on special topics.

9296
CSO: 4008

APPLIED SCIENCES

IMPROVED HELIUM-NEON LASER WITH LONGER USEFUL LIFE ACHIEVED

Beijing GUANGMING RIBAO in Chinese 19 Dec 79 p 1

[Article by Xu Dezu [1776 1795 4371]: "Shanghai Institute of Optics and Precision Instruments, Chinese Academy of Sciences, Solved a Problem Related to the Useful Life of Helium-Neon Laser"]

[Text] One of the key problems related to the He-Ne laser research and construction in this country which remained unsolved for an extended period of time--the problem of short useful life--has been solved by an effort exerted by the Shanghai Institute of Optics and Precision Instruments, Chinese Academy of Sciences. The hard film He-Ne laser sealed in a low-melting point glass manufactured by the said institute recently has been authenticated. It is considered to mark important progress made in the He-Ne laser technology of this country. The laser is now ready for popularization.

The He-Ne laser is one of the earliest atomic gas lasers. It is highly monochromatic and possesses excellent directivity. Besides these, it possesses such other advantages as low cost and simple construction, and is easy to operate. As such, it has been widely applied in various fields of sciences including scientific research, industrial and agricultural production, defense construction, and medical treatment. Since the first He-Ne laser equipment was built in the laboratory in this country in July 1963, more than 100 units all over the nation have taken part in its trial production, with a great deal of overlapping work effort due to lack of coordination and scientific management. Thus the problem related to the short useful life of the He-Ne laser remained unsolved, because no one took the responsibility to attack the problem exclusively. The problem, therefore, became one of those "great old difficult" problems. Focusing on this problem, the Shanghai Institute of Optics and Precision Instruments of the Chinese Academy of Sciences carried out in recent years a series of 11 basic research items, including research on leakage rate, mass spectrum analysis, and sealing mechanism. They have finally succeeded in solving the key problem related to the short useful life of the He-Ne laser, extending its useful life to more than 10,000 hours, an increase of more than 6,000 hours. The first batch of the improved laser equipment has been in continuous operation for 14 months, and they are still performing satisfactorily. These instruments are greatly appreciated by the users.

9113
CSO: 4008

PROBLEMS TO BE SOLVED IN LASER RESEARCH, DEVELOPMENT OUTLINED

Beijing GUANGMING RIBAO in Chinese 9 Oct 79 p 2

[Article by WENHUIBAO reporter Su Ruichang [5685 3843 1603] and GUANGMING RIBAO reporter Jia Shumei [6328 2885 2653]: "How Should Laser Research and Production Be Carried Out?"; passages enclosed in slantlines printed in boldface]

[Text] In the realm of our newly emerging science and technology, lasers are a field of fairly rapid development and great achievements. From the beginning of laser research in China in 1961 until now, some 10 specialized institutes have been established which are just coming into their own, over 60 institutions of higher learning have set up special laser sections or research laboratories, a number of factories have been established which produce laser components or whole lasers, ranks of over 10,000 personnel specializing in lasers (of which 30 percent are scientific and technical personnel) have been formed, and over 200 scientific research findings have been obtained, of which over 20 have reached or approached advanced international levels.

However, a series of new problems have been encountered in the development of laser technology, which urgently need to be solved. According to investigations by the departments concerned, on 113 institutes, plants, and schools involved with laser research and production in 16 provinces and municipalities nationwide, and reports by some experts who have been working in laser research for many years, at present we must solve the following problems:

/1. Improve the Current State of Organizational Confusion and Scattering of Forces, and Strengthen Unified Planning and Administration./ At present, our laser research and production is divided into four main systems: the Academy of Sciences, national defense offices, industrial ministries concerned, and local science committees. Since we lack a single administrative unit with an authoritative voice, for a long time we have duplicated the same work and wasted a great deal of human and material resources. Three times, in 1973, 1976, and 1978, all-China laser plans were drawn up.

Basically they were simplifications and addition to the plans for the four main systems, with no authority and no finding force. The more things were planned, the more scattered they became. For example, in the 1973 plan, more than 10 units were engaged in developing helium-neon lasers. In the 1976 plan, they increased to 40, and since 1978, they have swelled to nearly a hundred, most of which are involved in just the one type, but the quality of their components is not up to standard. As another example, as many as several dozen units nationwide make lasar instruments. They have made 10 or 20 models and the trend is still to make more, of which most are unnecessary duplications. How can we put up with such waste and duplication? Since the system of leadership and system of administration are irrational, and since each unit makes its own policy, and each department bears and allocates its own expenses and assigns its own research and development tasks, there is no way to realize planning and coordination nationwide. In view of this situation, some scientific and technical workers have suggested setting up organizations like an all-China laser office or laser scientific and technical company to unify the administration of research and production in laser technology nationwide, to unify leadership, to strengthen coordination, and to use methods such as appropriation, best-in-equipment selection, quality indexes, legislation, and natural selection to overcome the state of departmentalism and anarchy. This seems to make a lot of sense.

/2. Correct Handling of the Relationships Between Research and Development of Component Parts and Whole Sets./ Components and assemblies are the foundation of whole sets and they should get serious attention. However, when some units are drawing up plans or allocating expenses, they look on them as something they can do without and so they omit them. Every time they are cited in the newspaper, put on display, or rewarded, it is always for outstanding whole sets and nothing is ever said about the role of components. Therefore everybody vies for the projects dealing with whole sets and foists the production of components off on the neighborhood factories. According to incomplete statistics, over 80 percent of our capabilities nationwide are concentrated in research and production projects for whole sets, which means that the components and assemblies that are now used constantly, are not up to standard and the products meeting specifications are incomplete, leaving many departments of practical applications with no choice but to develop components and assemblies and to do everything large or small on their own, which creates confusion and waste. Therefore it is necessary to set aside some institutes and plants to specialize in research and production of laser components in order to build a good foundation to develop laser technology.

/3. Strengthen the Intermediate Trial Links To Transform Large Quantities of Scientific Research Results Quickly into Productive Forces./ Taking the commonly used lasers, there are about a dozen types, but there are only two, He-Ne and CO_2, that are sold as commercial products in volume. There are several dozen types of whole sets fairly well-developed for practical use but there are only a few under production at present. The reason is that the human and material resources of the research institutes are limited and we lack pilot plants which can carry out small-volume production. Furthermore, since new products usually mean small volume, new manufacturing processes, and complex technology, production units which would want to undertake responsibility for production would be bound to increase costs and reduce profits, and so none want to take on new products. The results are: a new product is successfully developed, evaluation meetings are held, and prizes are awarded, yet in the end no plant can be found to accept production and the user departments can only worry helplessly or even have no choice but to spend foreign exchange to buy from abroad. This shows that from basic research in new technology to the spread of its practical application, we still lack an extremely important link, the intermediate trial or product development link, so that research and production are disconnected and it takes a long time before laser technology can become productive capacity. The rapid establishment of a number of such intermediate pilot plants has become a matter of current urgency. At the same time, we should also draw up an economic policy to encourage research institutes and institutions of higher learning to run intermediate pilot plants.

/4. Link Up the Supply, Production, and Marketing Channels, and Promote the Development of Research and Production./ The discipline of lasers touches upon many fields such as optics, mechanical engineering, electronics, chemical engineering, and atomic energy. The types of components, materials, and assemblies needed number in the thousands. Though the quantities they are needed in are not very large, the requirements for precision and purity are very high. Most of the equipment and assemblies presently have no normal channels of supply and cannot be found in even the most rudimentary product catalogs or advertisements. Therefore, scientific research personnel have to spend a third of their time running around after equipment. Even when whole sets get produced, it is not known who wants them. For example, a laser leveling instrument developed and produced by the Yantai Optical Instruments Plant [Yantai guangxue yiqi chang 3533 0669 0342 1331 0337 0115 0617], was evaluated in 1977 as having reached advanced domestic levels, but since the need was not understood, only 18 were produced. This year, the same plant placed an advertisement in GONGREN RIBAO and in only 10-odd days, received over a hundred letters from some 10 industries in 27 provinces and municipalities nationwide, inquiring about the price of placing an order. This amply shows that the channels of production and marketing are not clear, and there is just no way to begin talking about the development of laser work. In some scientifically and technically advanced nations, the laser industry has already become a flourishing new branch of industry. We should also actively create the conditions, including linking up the supply, production, and marketing channels, to establish China's laser industry as quickly as possible.

/5. Raise the Level of Theoretical and Basic Research and Transform the Backwardness of the Means for Experimentation and Testing./ At present, much theoretical and basic research work basically uses obsolete means of experimentation and duplicates work already done abroad with extremely little originality. Moreover, most scientific research projects also basically copy the paths of foreign technology. They are carried out from the beginning according to the requirements of engineering projects. They ignore the search for basic laws and the thorough analysis of physical phenomena, or don't even mention putting theory on a deeper level. Therefore, we have no choice but as quickly as possible, to train high-level basic research personnel, including industrial technical research personnel, to effectively intensify theoretical and basic research, and to quickly transform the backwardness of the means for experimentation and testing, before we can genuinely develop original research and make every effort to catch up with the advanced world levels.

7755
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APPLIED SCIENCES

EDITING, TYPESETTING OF CHINESE CHARACTERS BY COMPUTER, LASER DEVELOPED

Beijing GUANGMING RIBAO in Chinese 23 Nov 79 p 4

[Article by Qi Shibo [2058 0013 0130] of Beijing University]

[Text] When we talk about typesetting, people naturally think of using lead type and the complicated typesetting procedures of picking the type, setting the plates, printing, etc. Using the computer and laser to edit and typeset Chinese characters provides another scenario. Here, lead type which have been in use for several hundred years are nowhere to be seen, nor does one feel the high temperatures of the typecasting shop. An orderly, clean and bright computer room has replaced the typesetting shop. Chinese character keyboards have replaced the racks for lead type. Black and white photographic plates have replaced heavy lead plates. People have been liberated from the heavy manual labor and productivity has been greatly enhanced.

How do the computer and laser work in performing editing and typesetting functions?

To typeset, there must first be fonts. The fonts in the computer-laser system of typesetting Chinese characters are different from the fonts of lead type. The computer uses a binary counting system. It recognizes only two signals, 0 and 1. But Chinese characters are very complex. How can they be represented by 0 and 1? Let us begin by describing large group callisthenics. The words formed by group callisthenics are made up of many flags of different colors (for example, red and white) held in people's hands. These people stand in orderly matrices. When they form a word, some of the people in the matrices raise their red flags in the order of the strokes of the Chinese characters and other people raise their white flags. If the people with red flags are designated as 1 and those with white flags are designated as 0, then this matrix becomes the 0 and 1 signal for the character. In the same way, if we write a character on a sheet of graph paper and designate all squares through which a stroke of the character passes as 1 and the blank squares as 0, then the collection of all squares designated either as 1 or 0 is the type of the character in the computer. This designation is called digitization of Chinese characters. The 0 and 1 signals that form this character are called digitized types (or digitized dot matrices). There are many Chinese characters, many type faces and many point sizes (over a dozen different sizes from small to large). To store them all in the computer as digitized types requires at least over 20 billion bits. This number is obviously too large for the capacity of present-day computers. Thus solving the problem of storage for Chinese character types in the computer has become the key to realizing typesetting by computer and laser. Not long ago, Beijing University and concerned coordinating and cooperating units successfully developed a set of methods of packing Chinese character signals so that not all of the 0 and 1 signals of each Chinese character is stored in the computer but stored in the computer are packed formats of the digitized character types of the Chinese characters (called packed signals). Thus, the difficulty of storing all the character types of Chinese characters in the computer was overcome.

Typesetting by the computer requires "telling" the computer about the original copy. (Actually, this should be feeding the original material or inputting it into the computer). The computer recognizes only numbers and the original copy must be changed to numbers representing the Chinese characters before it can be "recognized" by the computer. The method presently being used is to render the Chinese characters into numbers according to the frequency of usage. The number of each character corresponds to the digitized type of this character in the computer. The computer accesses the type of the character according to the number of this character and typesets it. How is the computer told the number of the character being used? Ordinarily, this is done through a Chinese character keyboard of appropriate design. The typesetting and editing system of Chinese characters by computer and laser designed by our nation uses two kinds of keyboards: One is called the large keyboard similar to a Chinese typewriter. The keyboard contains over 3,000 characters. By pressing a particular character key, the number of that character is obtained and this number can also be punched onto a paper tape and then fed into the computer. The other kind is the medium keyboard consisting of over 200 keys. Each key represents two or three character-symbols (whole characters or radicals). Each character is composed of one or several key strokes.

After the copy has been typeset, the next step is proofing. This work is performed automatically by the typesetting and editing system by computer and laser. To see if the original copy fed into the computer is correct or not, the content can be printed out by the Chinese character printer in text form. The Chinese character keyboard and the Chinese character display screen (CRT) can be connected to perform automatic corrections. If a certain character is to be corrected, all that is required is to move the special symbol shown on the screen (called a cursor) to the character on the screen and strike the correct character on the keyboard. Thus, on the screen, the original character will be replaced by the new character entered by the keyboard. When a continuous string of characters are typed on the keyboard, the characters on the screen can be replaced one by one. The substitution is then input into the computer.

The edited original copy is then typeset by the computer (the computer will compose and output the plate). Using the computer to typeset sounds mysterious at first but the principles are not. Typesetting, simply speaking, is to fix the point size of each character and the position of each character on the plate. All that is required is to write in the specifications of the page and format of the book or the newspaper and feed them into the computer along with the original copy. The system contains a special program that performs typesetting. It will compute the position of each character according to specifications. In book printing, when a page is filled, top margin and page number will be automatically added. Then the computer performs the calculations for the following page. In this way, an entire book can be completely typeset continuously within a shorter time. In typesetting newspapers, the CRT display and different colors can be used to show distribution of text, headlines and decorative borders. Text which cannot be set within the designated space and where space is available can also be indicated so that the page editor can adjust the format via the computer. When the format of the plate (page) is satisfactory, the operator can enter on the keyboard the command to phototypeset the page and the laser printer will photograph the typeset page onto a film.

The laser printer works according to the commands from the computer and the phototypesetting controls. When the software is completely typeset, and when signals of the characters on every line, the type faces, point sizes and positions of these characters are received, the phototypesetting control mechanism will access the digitized types according to the numbers of these characters and then transmit the signals of these types to the switches that control the laser. The switches will operate according to the 0 and 1 signals and by doing so they operate the laser which blinks accordingly and emits intermittent light upon the photographic film. The film is sensitized by the light and shows characters composed of dots of light. This film is then developed into a plate for printing.

Using the above method of laser scanning also makes it possible to realize direct etching. A 3 to 5-watt laser bundle can be directly flashed upon a plate, etching the plate into an embossed plate according to the shape and distribution of the characters, thus eliminating the entire set of photographic procedures of film development, image fixing, etching by errosion and photographic plate making.

After the entire system begins operation, not only will the production of the printing industry be changed fundamentally, if the system is connected with the telecommunications system, it will also completely change the present method of news transmission throughout the nation. This will also facilitate establishment of a news and information retrieval system.

9296
CSO: 4008

APPLICATION OF COMPUTERS EXPANDING

Rapid Application, Popularization

Shanghai JIEFANG RIBAO in Chinese 6 Nov 79 p 2

[Article by Gu Xunfang [7357 6064 2455], Deputy Director of the Computer Committee of Shanghai and Deputy Director of the Planning Committee of Shanghai: "Hasten the Steps in the Application of Computers"]

[Text] The computer is a new born industry. The level of computer science and technology, the scale of production and the degree of application are important indicators to measure a nation's level of modernization. Especially during the latter part of the 1970s, computers have developed rapidly in advanced industrial nations not only in performing mathematical computations, and rapid application in automation in industrial production, but also penetrated ceaselessly into the national economy, every realm of social life, and have become an indispensable and highly efficient scientific tool of information processing in business management, post and communications, commercial banking, statistics, automatic retrieval of information and even family life. Computers also function as the key thrust in national defense, pioneer scientific research and aviation technology.

The scientific research and test development of the electronic computer in Shanghai are not considered late. In 1960, the first computer using electronic tubes was successfully developed. Over the past 20 years and three generations (electronic tubes, crystal tubes, integrated circuits), over 30 types and models of computers have been developed and produced totaling several hundred computer units for the needs of national defense, scientific research and automation of production. Because of interference and sabotage by Lin Biao and the "gang of four" and shortcomings in our work, the work of developing the computer, applying it and popularizing it lagged far behind the advanced levels abroad. Incomplete statistics show the city's 172 scientific research and production units of 28 professions own a total of over 330 computers of various types. Of these, only one-fourth are being used well or relatively well, another one-fourth are being used less efficiently. Others are being installed and still others have not been used. The weakness in the work of popularizing the computer not only includes the unstable quality of the computers, incompleteness of the peripheral equipment, the lack of maintenance technology and service forces but one of the major reasons is that many leading cadres do not have a sufficient understanding of the important functions of the computer in raising the levels of production, technology, and management. Necessary support and help from them are lacking. A strong technical service team for application and popularization of the computer has not been established. Technical questions concerning popularization and application of the computer have not been grasped with great effort. Therefore, many who have a computer cannot use it or operate it, or the computer is used only now and then and it cannot serve its purpose well.

To enable the computer to be popularized and applicable to serve the Four Modernizations, and to enable the computer to perform important functions in developing the movement to increase production and conserve energy and to explore potentials for energy conservation and reformation and rebuilding of the old enterprises, the leadership must first liberate its thinking, break away from the mystique about electronic computers and the thought that computers are out of reach. The beliefs that production is still the same without computers, the use of computers for automation is just "extras" and that the use of computers is not an urgent task are wrong. It should be pointed out that the industrial departments use computers not to replace a few people. The main thing is to raise production, raise quality of products and explore the equipment's potentials. At the same time, the electronic computer is also a forceful scientific tool indispensable in raising the level of business management in plants and factories. Therefore, its application and popularization is never limited to the few units involved in pioneering scientific research, national defense and military engineering but an important means indispensable to overall realization of more, faster, better and more economical results in raising the level of technological management.

To hasten the application and popularization of the computer, the spirit of self reliance must be developed to work and learn at the same time and to cultivate step by step a strong team in computer technology. Before the computer room of the Shanghai Chemical Engineering College accepted the installation of a computer, there was nobody at the plant who had learned about computers. In the course of installing and testing and adjusting the computer, they learned from the technicians and workers of the computer manufacturing plant. The plant and the school cooperated to attack the problems and finally after more than half a year, the computer was installed, adjusted, tested and began operation. The personnel learned through practice and changed themselves from being outsiders into experts. At present, they tied the computer in with teaching and scientific research work. Several hundred teachers have already participated in computer learning classes, forming a team to apply and popularize the computer and brought scientific research and design work in chemical engineering to a new level. Some units, in the course of using the computer to conduct automatic testing and control functions and scientific computations, lacked the necessary peripheral equipment and specialized instruments to obtain correct signals. So they used their own hands to overcome each hurdle and finally successfully built their own peripheral equipment as the computer's sensitive ears, eyes, hands and feet and enabled the whole facility to begin normal operation in time.

Strengthening leadership, organizing and ceaselessly exchanging and summarizing experiences, learning from each other and joining together to overcome the difficulties are an important way to rapidly both popularize and utilize the computer. At present, the computers which the units in Shanghai have are varied and their uses are different (some for scientific research computations, some for automation of production). Their use and the experiences accumulated all have their unique characteristics. We must not only humbly learn the advanced experiences of other nations but also must pay attention to conscientiously summarize our own experiences, frequently summarize and exchange our experiences, strengthen technical cooperation and coordination, take the advantage to supplement shortcomings on a mutual basis, and reach the common goal of raising the level of sophistication. Each plant producing computers, peripheral equipment and automatic instruments should conscientiously raise the quality of their products and establish the spirit of serving the users and clients and be responsible and supply peripheral equipment along with the main frame machines at the time the main frame machines leave the manufacturer. Computer application service departments approved for establishment should begin work as soon as possible. In this way, popularization and application of computers will become active and the usage of computers will greatly be raised.

Shanghai is our nation's important industrial, scientific and technological base. Its computer industry already has a definite foundation. We must strengthen leadership, hasten the steps, strengthen management, create conditions to do the work in producing computers, producing main frame machines and peripheral equipment packages well and to do the work in popularization and application well so that new contributions can be made towards realization of the Four Modernizations.

Use in Paper Making Machines

Shanghai JIEFANG RIBAO in Chinese 6 Nov 79 p 2

[Article: "Quality of the Paper for Capacitors Produced by the China Board and Paper Plant Is Raised by a Large Scale"]

[Text] The China Board and Paper Plant elevated the quality of paper for capacitors after it used a domestically manufactured electronic computer to control two paper making machines.

The China Board and Paper Plant is an old plant with a history of over 50 years. The plant produces paper for capacitors used in the electronics industry. Thickness of the paper is only several micrometers and the quality must be high. In the past, operational speed of the paper making machines was manually determined. The cycle was long and operating speed could not be accurately grasped in time. Therefore, the quality of the product was unstable. This affected raising the quality of electronic components. This plant's leaders did not sit and wait for new equipment to be brought in but used an industrial control computer manufactured in Shanghai. With the support and coordination and cooperation of the management departments and fraternal units, plant workers used their own hands and bravely created new things. At the beginning of the fourth season of 1977, they used the computer and realized automatic inspection and control of the operation of the paper machine. After ceaseless improvements, the computer has been able to operate for over 7,000 hours maximum without breaking down. This brought youth to the paper machine of the 1940s. Operating speed of these two original machines fluctuated about 5 percent. After being controlled by the computer, the fluctuation dropped to below 0.5 percent, raising the quality of the paper for capacitors and the paper earned the title as "a trustworthy" product among the light industries. Simultaneously with the use of the computer, the work in business administration was elevated and the production rate of paper for capacitors increased by 14 percent. Thus, a road for the reform, remodeling and exploring the potentials of old plants is created.

Type of SS Software System

Shanghai JIEFANG RIBAO in Chinese 6 Nov 79 p 2

[Text] The Shanghai Organic Chemistry Institute of the Chinese Academy of Sciences has successfully developed a kind of SS software system enabling domestically manufactured small electronic computers to perform greater functions and better serve science.

The DJS-131 computer is a multifunctional small computer that is being installed more widely throughout the nation at present. But it lacks peripheral magnetic disk storage and thus the system cannot be used. This has greatly reduced the computer's efficiency. Scientific researchers of the second group in Laboratory No 10 of the Shanghai Organic Chemistry Institute of the Chinese Academy of Sciences based their work on the small capacity peripheral storage magnetic drum which comes with every DJS-131 computer and began to study using the magnetic drum to control the computer. After a year's efforts, they successfully developed a magnetic drum documents control system (abbreviated SS system). At a meeting in July this year, the system was examined and reviewed and all participating comrades decided that the system was a success. They established a software program storage based on the magnetic drum for the DJS-131 computer, made it easy for software workers to write the software and raised the efficiency of work by over threefold. They also successfully used a complex language in the computer based on the normal operation of the SS system and with the support of the Shanghai Radio Plant No 13. This changed the original limitation of the machine which could only use a simple language and some complex computational problems were also solved.

As software is increasingly being perfected, they grasped maintenance and improvement of the machine and actively launched applications of the computer in chemistry. For over a year, they have written such applicational programs as "image recognition," and "multiple recursive analysis." During this period, they also gathered a group of chemical workers who had strong desires to apply the computer by holding short training classes, discussion classes, coordination activities among laboratory groups and many other methods. Some good research results have been achieved.

9296
CSO: 4008

4000 BITS INTEGRATED CIRCUIT SUCCESSFULLY MANUFACTURED

Beijing GUANGMING RIBAO in Chinese 26 Dec 79 p 1

[Article by correspondents He Chunfan [0149 2504 5672], Feng Yinzhang [7458 2019 4545] and reporter Zou Anshou [6760 1344 1108]: "The Semiconductor Institute of the Chinese Academy of Sciences Achieved Another Important Result; They Have Successfully Manufactured a 4000 Bits, Large-Scale Integrated Circuit"]

[Text] The semiconductor technology research of this country has achieved another important new result. The semiconductor Institute of the Chinese Academy of Sciences has successfully manufactured an N-groove silicon grating MOS dynamic adaptable storage.

This type of large-scale integrated circuit is highly integrated and is capable of storing more than 4000 bits of digital information simultaneously. Its integrated density is very high, packing more than 11,000 electronic elements on a silicon chip no more than 4 x 4 square millimeters in size. Its speed is very high, requiring only 300 nanoseconds or so to store or retrieve a digital signal. Since the clock-controlled circuit and the peripheral circuit are integrated on the chip, its performance capability is more complete. This achievement has created a much better condition for manufacturing the large-scale high-speed computer in this country. It has also established a sound foundation on which to build ultralarge scale integrated circuit.

At present, the model chips of three different design patters of the same type of semiconductor have been made. The small-scale production rate of one of the design pattern chips is better than 20 percent, which is the highest domestic level ever achieved. This undertaking also provided an important experience for solving the problem concerning the production rate related to manufacturing of large-scale integrated circuit chips in this country.

This research and construction work was directed by a semiconductor expert, Deputy Director of the Semiconductors Institute Wang Shouwu [3769 1343 2976] himself. During the course of their attacking the barrier, they were positively assisted and supported by every concerned unit.

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CSO: 4008

SHANGHAI SILICATE INSTITUTE CREATING NEW MATERIALS

Shanghai JIEFANG RIBAO in Chinese 19 Dec 79 p 1

[Text] The Shanghai Silicate Institute of the Chinese Academy of Sciences has organized scientific research according to the needs of the national economy and for the past 3 years has made 40 achievements in scientific research, 15 of which have won awards as great achievements from the National Science Conference last year.

The institute is a scientific research unit that mainly studies new types of inorganic materials. During the 3 years after crushing the "gang of four," and after reorganization in scientific research, it established goals for the near future and the relationship among long range exploration, materials research and instruments applications. Key research topics have been established according to the needs of the national economy and national defense industries to develop our nation's various pioneer technology in aviation and space sciences, acoustics, laser, computer, and modern telecommunications. It has provided new types of inorganic materials that are urgently needed. The institute's success in the study of the new technological method of synthesizing large single crystals of mica has provided our nation's electronics industry with a kind of high temperature insulation material. The synthetic mica has a better tolerance to high temperatures than natural mica. It performs well as a coating to control temperatures in satellites. It has been used on all types of satellites of our nation and some of its properties have already reached international standards. In functional inorganic materials, the institute successfully studied man-made crystals. The varieties are comprehensive and the quality is superior. They have received praise from international academic conferences.

The silicate institute strengthened propagation of its scientific research results to change the results of scientific research into productive forces as soon as possible and to create more worthwhile things for the national economy. In structural inorganic materials, the institute successfully developed hot pressed silicon nitride material. Its mechanical strength is high, its hardness surpasses that of the various kinds of hard alloys frequently used. With the cooperation from fraternal units, the institute has propagated and applied it in the metal cutting industry. Cutting instruments made from the silicon nitride can cut various kinds of quenching steel of a high degree of hardness, cold hardened cast iron and aluminum alloys. Their useful life is several times to over a dozen times longer than ordinary hard alloy cutting instruments. Reactive sintered silicon nitride material has been widely used in the petrochemical industry and machinery industry as superior material for wear-resistant and corrosion-resistant parts. The box type enamel solar energy water heater successfully developed by the institute and the far infrared coating and instruments and a series of such achievements have produced results in developing and conserving our nation's energy resources. Among these achievements, the far infrared coating and instruments have been widely produced and used within the boundaries of the entire nation. They have showed visible results in raising the efficiency of production and quality of the products and especially in conserving the use of electricity. In addition, the glass for the kinescope of black and white television sets successfully developed by this institute has turned losses of the Shanghai black and white kinescope manufacturing into profits. The life of the kinescope can reach above 5,000 hours and the quality has been judged as the best in the nation.

During the past 3 years, the silicate institute has also continuously been strengthening basic research and developing our nation's materials science and has made some promising progress. For example, in the analysis of the mechanism of caustic embrittlement of compound materials and the exploration of the pattern of distribution of tension in fiber optics, some research results of guiding significance have been obtained.

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CSO: 4008

BRIEFS

TAPE RECORDER PRODUCTION INCREASE--The city's electronics equipment industry has increased the production of tape recorders on a large scale. Production between January and October has increased by over onefold from that of the same period last year. Tape recorders are a best selling item on the market. Since the beginning of this year, this company has actively taken measures to increase development points and expanded the capabilities of tape recorder production. Staff members and workers of the Shanghai Radio Plant No 3 and the Shanghai Tape Recorder Equipment Plant spent less than half a year and successfully developed the Chun Lei Brand 3 L 1 model and Shanghai Brand L 316 model case type tape recorder and these were rapidly put into production to supply the market. The price of the Huanqiu Brand 701 model disk type dual function recording and playback tape recorder produced by the Yungjian Tape Recorder Equipment Plant dropped from 460 yuan to 298 yuan. [By Xue Chuan [1331 1557], Geng Fa [2704 4099], and Ming Yu [2494 6170]] [Text] [Shanghai WEN HUI BAO in Chinese 5 Dec 79 p 1] 9296

GUANGZHOU ELECTRONICS RESEARCH INSTITUTE--After technicians of the Guangzhou Electronics Technology Institute of the Chinese Academy of Sciences overthrew the "gang of four," they made up their minds to engage in scientific research and up to the middle 10 days of November of this year, they have realized nine scientific research achievements. The nine scientific research achievements are: RG-1500 ton model V coil type ultra-high voltage equipment, JR-1 model laser holographic tire damage inspection instrument, procedural control device, electronically operated automatic Chinese herb picker, single crystal of lithium fluoride, goniometer and signal generator for use on balloons for space science exploration, small sized laser of nitrogen molecules with porcelain energy store, infrared crystals of thallium bromide-thallium iodide, and large sized printed circuit camera. Some of the above scientific research achievements have been approved for test application and others have already been used in industrial production. The RG-1500 ton model V coil type diamond press has successfully been used to make synthetic diamonds. The single generator and the goniometer have been used in the retrieval experiment of our nation's first space science exploration balloon and have been tested. Infrared crystals of thallium bromide-thallium iodide are important elements and components used in various infrared instruments. Their performance is superior. The successful development of crystals of lithium fluoride has provided superior quality material for the lenses and achromatic lenses of various optical instruments. [By Guo Jilian [6753 4949 5114]] [Text] [Guangzhou NANFANG RIBAO in Chinese 21 Dec 79 p 3] 9296

DATA PROCESSOR FOR TESTING WHEELS--The teachers of the teaching and research laboratory of electrical engineering of the department of mechanics of the Shanghai Railroad Institute struggled for 16 months in cooperation with factories under a program sponsored by the school to successfully develop our nation's first data processor which utilizes computing techniques to perform automatic testing and data processing as well as probability and statistical functions for processing of mechanics data of wheels and axis of locomotive cars. They have contributed to the scientific research in our nation's railroad safety. For a long period the scientific research institute of the Ministry of Railroads has been studying the causes of derailing, properties of motion of locomotives and cars and the life of wheels and axis to assure safety in railway operation. But, because there was no data processing equipment, the only way was by taking photographs to record the wave forms of experiments and then by measuring with a ruler to obtain each piece of experimental data. This kind of manual method of calculation took a long time and the results were not accurate. With the data processor, technicians can be liberated from the tedious process of data processing. In the past, the amount of data computed by a skilled technician in 12 days now requires only one minute to complete and the results are directly printed out. [By Li Yangpin [2621 2799 2430]] [Text] [Shanghai WEN HUI BAO in Chinese 16 Dec 79 p 2] 9296

OPTICS SOCIETY ESTABLISHED—XINHUA, 26 Dec, Beijing—The China Optics Society was established recently in Beijing. Vice President Fang Yi spoke at the conference. Vice President of the Chinese Academy of Sciences Yan Jici reviewed the history of optics research and development in this country. A famous opticist, Wang Daheng [3769 1129 3801], made a report about optics research and various achievements made in this country over the past 30 years since the establishment of this nation. More than 100 papers were presented by the optics research workers of this country, and a wide range of technical ideas including, for example, basic optics, engineering optics, laser optics, infrared technology, and optical materials were exchanged. The invited guests, the president of the European Optics Society and the director of the Paris Theoretical and Applied Optics Institute, Prof Andrew Marshall, and Dr Wang Zhendian [3769 2973 7844] of the U.S. Ford Motor Company, each presented a technical report. During the conference, the constitution of the society was adopted, and its board of managers elected. Yan Jici was elected to the honorary directorate general and Wang Daheng, the director general of the board of managers. [Text] [Beijing GUANGMING RIBAO in Chinese 19 Dec 79 p 1] 9113

FUDAN UNIVERSITY ELECTRONICS MEETING--At the Meeting to Review Scientific Research at Fudan University which was concluded yesterday, over 300 specials and scientific workers from the city and from places throughout the nation reviewed 11 scientific research results successfully achieved by the Physics Department and the Second Physics Department of Fudan University. After review, the specialists believed the majority of these results are firsts to be successfully developed in our nation. Among them, such items as the "inplanted and controlled type of heart beat generator's integrated circuit," the "enclosed type soft X-ray electrical potential spectrograph," the "8-bit high speed interface circuit I-0 interface of microprocessors," "PCH-I smoothness tester for blind modules and silicon chips" and "Coherent Anti-Stokes-Raman Spectrum" have reached the international level of similar types of products of the 1970's, they have filled our nation's void in these areas and have contributed towards the development of our nation's large scale integrated circuits and newly emerged laser science. [Text] [Shanghai JIEFANG RIBAO in Chinese 7 Dec p 1] 9296

JIANGSU GEOLOGY PUBLICATION--Nanjing, January 26--"The Geology of the Mountains and Waters of Nanjing," the first of a series on "The Geology of Scenic Spots in China," has gone on sale. The series are being compiled by the editing office of the State Geological Bureau and published by the Geological Publishing House. The book deals with the geography, history, archaeology and geological formations of the Nanjing area, and gives scientific but easily understandable explanations of the natural phenomena. Nanjing was one of the four ancient capitals of China, the other three being Xian, Loyang and Beijing. Eight feudal dynasties and kingdoms made Nanjing their capital. In the Nineteenth Century, the leaders of the Taiping heavenly kingdom, the biggest peasant uprising to occur in China in the 19th Century, founded a capital here. Palaces, temples, gardens, imperial resorts, lakes, forests and mountains in Nanjing attract a lot of visitors. The series will cover Nanjing, Beijing, Hangzhou, Guilin, Xian, Huangshan, Omei Mountain, Mount Qomolangma, Changhai Mountains and Tianchi Lake, several dozen subjects in all. Books in the series are considered not only tourist guides but also popular science books. [Text] [OW270234 Beijing XINHUA in English 0703 GMT 26 Jan 80 OW]

TV LECTURES ON COMPUTERS--On the 11th of this month, at 10 am every Tuesday, the Shanghai Television station will telecast lectures on computers on Channel 5. The lectures will be given by the Shanghai City Computing Technology Research Institute and topics will cover: general introduction to computer systems; software; brief introduction to ALGOL-60 computer language; COBOL data processing language; and the correct use of the computer. [By Sun Yiming [1327 0001 7686]] [Text] [Shanghai JIEFANG RIBAO in Chinese 10 Dec 79 p 1] 9296

CSO: 4008

LIFE SCIENCES

BRIEFS

SHANGHAI CITIZENS LIVE LONGER—The average life span is up to 70.8 for males and 75.48 for females; an increase of more than 28 years for both sexes compared to 1951. Based on estimates provided by related units in this city, the average life span for the entire citizenry of Shanghai (including the suburbs) is already up to 70.8 years for males, and 75.48 for females. Recently, the average life spans of the populations of the United States, Japan and Great Britain were 68.2, 71.16 and 67.8 respectively for males and 75.9, 76.31 and 73.8 respectively for females. The average life span for males living in Shanghai in 1951 was 42.74 years and 46.76 years for females. [Zheng Lai] [Excerpts] [Shanghai WEN HUI BAO in Chinese 29 Dec 79 p 1]

CSO: 4008

SCIENTISTS AND SCIENTIFIC ORGANIZATIONS

BEIJING UNIVERSITY GENETICIST LI RUQI PROFILED

Beijing GUANGMING RIBAO in Chinese 2 Dec 79 p 1

[Article by Huang Jingjun [7806 2529 6874]: "One Must Run Ahead of Time--On 85-year-old Professor Li Ruqi of the Biology Department of Beijing University"]

[Text] Comrade Li Ruqi [2621 3067 4388], 85-year-old professor of biology of Beijing University and director of the board of the China Genetics Society is still writing books, leading graduate students, lecturing to young and middle aged teachers, and insists on riding a bicycle to work. His spirit of devoting himself to the Four Modernizations received people's praise and admiration.

Professor Li Ruqi studies biology and specializes in genetics. For several decades, he followed the development of this branch of study and traveled a difficult path. In a series of political movements and academic criticisms, all the crimes which were forced upon him were almost all related to his specialized research. There were three occasions that he had to give up genetics research work which he loved dearly. He said with emotion that genetics as pioneered by Morgan follows objective principles. It has already been proven by more and more scientific experiments and productive practices. Before 1956, our nation's genetics field labeled Morgan's school as a false science. This is a lesson that evokes deep thought. Using the saying of one school to represent the contentions of a hundred schools, using administrative orders to suppress academic contention, using political labels to confuse the true and false in academic endeavors are all ways to destroy science. It is impossible to make our nation's science prosper without democracy. The spring breeze of the national science conference has given renewed life to the dying and seemingly hopeless field of genetics. The genetics research team of the biology department of Beijing University that was disbanded has been organized again. Last year, a national genetics society was established in Nanjing and professor Li Ruqi was recommended to be the director of the board and chief editor of the "Journal of Genetics." At the same time, the sponsor of the "Chinese Encyclopedia" also came to see him and asked him to take up the editorial and compilation work for the part on biological science. In an instant, large amounts of work poured upon him like the tide waters making this old man who is past 80 very excited. He was encouraged. Facing a large amount of work, he did not become nervous and was not timid. He believed he had the responsibility and the duty to give all of his strength to the rapid development of the motherland's science.

For the past decade and more, the international development in biology, especially the development in genetics has been very rapid and has already entered into molecular genetics and genetic engineering. In these fields, our nation's level of scientific research is far behind compared to the level of advanced nations of the world. In this realm, an old hand is needed to lead the way urgently. Old man Li Ruqi said: "Let me undertake this task as best I can to serve as the old hand!" Based on reading through massive amounts of information from abroad, he learned the new achievements in genetics of other nations and wrote a special book called "Modern Genetics" which reflects the present situation in genetics as teaching material for the comrades in the teaching and research laboratories.

Now, comrade Li Ruqi is working on two things: one is to organize the knowledge which he has accumulated over many years into a book to be called "Development of Genetics". It contains over 400,000 words and 300 to 400 illustrations. The first draft of this book has already been completed and it is being edited at present. Another thing is conducting a modern genetics study class with two graduate students for the benefit of middle age teachers of the teaching and research laboratory of genetics of the Biology Department of Beijing University (middle age teachers from other units are also participating). He lectures 2 hours every week. Since the class began in the second half of last year, he has never been absent. In addition, he also has to receive visitors from other places and from abroad and answer various questions they ask him.

What force encourages this 85 year old man to shoulder such a heavy work load? Professor Li Ruqi answers in this way: "The party has given me, this old man in his final years, the youth of revolution. How can I not march forward with all my life!" Li Ruqi says he wants to race against the remaining time of his life on this new long march. He encourages himself to complete the duties he is shouldering before he loses his brain power, senses and the use of his arms and legs and he says he must run ahead of time.

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CSO: 4008

SCIENTISTS AND SCIENTIFIC ORGANIZATIONS

BRIEFS

STATISTICAL SOCIETY ESTABLISHED--NCNA, Hangzhou, Nov 17--China's mass organization which researches statistical science, the China Statistical Society, was established at Hangzhou on 10 November. Once established, the society will make broad contacts with international statistical science circles and participate in international statistical academic exchanges. At the general membership meeting establishing the society, recently held at Hangzhou, well-known economist and first bureau chief of the new China National Bureau of Statistics, Xue Muqiao [5641 1970 2890] was unaminously elected president of the China Statistical Society. Deputy chief of the National Bureau of Statistics, Li Chengrui [2621 2052 3843] and six others were elected vice presidents. The membership meeting also adopted a constitution and working plans. The society called upon each province, municipality, and autonomous region to establish local statistical societies and moreover, extended a welcome to statisticians in Taiwan Province to join the China Statistical Society. [Text] [Hong Kong ZHONGGUO XINWEN in Chinese 19 Dec 79 p 5] 9420

SCIENTISTS ADMITTED TO PARTY--National Political Consultative Commission commissioners, professors Lu Qingjun [4151 1987 7486], and Zhuang Fenggan [8369 6646 3927]; member of the Board of Directors of the China Electronics Society, research fellow Huang Bi [7806 2411], and member of the Board of Directors of the China Space Travel Society, research fellow Shen Tianhui [3088 1131 1979] joined the Chinese Communist Party in succession recently. Lu Qingjun, Zhuang Fenggan, and Huang Bi all have studied in America. Sharing a deep sense of patriotism, they returned to China during the 1950's. Shen Tianhui is a self-taught female semi-conductor expert and chemist. They have all made contributions to China's socialist construction and scientific and technological modernization. [Text] [Beijing GUANGMING RIBAO in Chinese 21 Dec 79 p 1] 9420

SCIENTIST ADMITTED TO PARTY--Eighty-three year old veteran Professor Pan Chengxiao [3382 2110 1321] was accorded the honor of joining the Chinese Communist Party recently. Pan Chengxiao is a deputy to the 5th National People's Congress, a member of the standing committee of the Chinese Society for the Promotion of Democracy, vice chairman of the Hebei Province Political Consultative Commission, and vice president of the Hebei

College of Engineering. As a young man he studied in America. During the past 52 years since returning to China, he has been involved in academic pursuits and has fostered the talents of literally thousands of qualified construction specialists for the motherland. [Text] [Beijing GUANGMING RIBAO in Chinese 21 Dec 79 p 1] 9420

CSO: 4008

AUTHOR: GONG Zuxun /7895 4371 1053/

ORG: Shanghai Institute of Biochemistry, Chinese Academy of Sciences

TITLE: "Aspects of Recent Advances in Plant Virus Research"

SOURCE: Shanghai SHENGWUHUAXUE YU SHENGWUWULI XUEBAO /ACTA BIOCHEMICA ET BIOPHYSICA SINICA/ in Chinese, No 2, Jun 78, pp 83-102

Text of English Abstract: This review covers mainly the following topics in plant virus research: the chemical composition and morphological structure of the virion, the replication, multiplication and self-assembly of the virion and the relationship between host cells and viruses. The advances were discussed and critically assessed.

Received 22 October 1977.

AUTHOR: LI Xiyang /7812 6932 2253/
JIN Huijun /6855 1979 0689/
TANG Yuwei /3282 3768 3837/

ORG: All of Shanghai Institute of Plant Physiology, Chinese Academy of Sciences

TITLE: "Repressive Effect of Asparagine on Gibberellic Acid-Enhanced Synthesis of alpha-Amylase in Bacillus Subtilis"

SOURCE: Shanghai SHENGWUHUAXUE YU SHENGWUWULI XUEBAO /ACTA BIOCHEMICA ET BIOPHYSICA SINICA/ in Chinese, No 2, Jun 78, pp 103-108

TEXT OF ENGLISH ABSTRACT: The formation of alpha-amylase enhanced by GA_3, ATP and 3', 5'-cyclic AMP in Bacillus subtilis is repressed by asparagine. Furthermore, experimental evidence indicates that asparagine represses the synthesis and does not affect the activity of alpha-amylase. The mechanism of the repressive effect of asparagine is not yet known. The possible mode of action of asparagine is discussed.

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AUTHOR: LI Zhaoyi /2621 2600 0034/
ZHANG Yaoran /1728 5069 3544/
CHEN Baosong /1115 1405 2646/
XU Xingzhen /1776 2622 3791/
WANG Hong /3769 5725/

ORG: All of Institute of Physiology, Chinese Academy of Sciences, Shanghai

TITLE: "Interaction Between Excitatory and Inhibitory Processes in LGN Neurones of the Cat"

SOURCE: Shanghai SHENGWUHUAXUE YU SHENGWUWULI XUEBAO /ACTA BIOCHEMICA ET BIOPHYSICA SINICA/ in Chinese, No 2, Jun 78, pp 109-118

TEXT OF ENGLISH ABSTRACT: With the method of an automatic discharge frequency counting technique, temporal and spatial interaction between excitatory and inhibitory processes in cat LGN neurones were studied quantitatively.

1. Temporal interaction. Immediately after a sudden change of luminance the discharge rate of LGN neurones increased or decreased exaggerately and then reached a relatively steady level. This brief temporal interaction between the excitatory and inhibitory processes (adaptation time) lasted about 0.1 second for the transient cells, and 4 to 8 seconds for sustained cells with small

/Continuation of SHENGWUHUAXUE YU SHENGWUWULI XUEBAO, No 2, Jun 78, pp 109-118/

receptive fields, for sustained cells with large receptive fields, it lasted 40 to 80 seconds approximately.

2. Spatial interaction. The extent of the peripheral inhibitory surround of the receptive fields as well as the strength of the inhibitory effect on LGN neurones were defined, by means of changing the dimensions of the illuminated area on the retina and calculating the average discharge rate of LGN neurones. The on- and off-responses of on-off cells could be affected simultaneously or selectively by adjusting the area of retinal illumination. There was no peripheral inhibitory surround for off cells.

3. The dimensions of the receptive fields of the LGN neurones with large receptive fields were related to the intensity of background illumination. High intensity background illumination led to a shrinkage of the receptive fields and made the response to the center area stimulation more prominent, hence the resolution would be improved. Under low intensity background illumination, the receptive fields were extended and the threshold of responses lowered due to spatial summation, the sensitivity would be increased as a result.

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AUTHOR: DONG Xinwen /5516 2450 2429/
JIANG Zhihua /5592 5347 5478/
FU Laiwen /0265 6336 2429/

ORG: All of Shanghai Institute of Physiology, Chinese Academy of Sciences

TITLE: "Changes in Monoamine Fluorescence Intensity in the Rat's Midbrain Raphe Nuclei and Locus Coeruleus in the Process of Acupuncture Analgesia"

SOURCE: Shanghai SHENGWUHUAXUE YU SHENGWUWULI XUEBAO /ACTA BIOCHEMICA ET BIOPHYSICA SINICA/ in Chinese, No 2, Jun 78, pp 119-125

TEXT OF ENGLISH ABSTRACT: The changes in monoamine fluorescence intensity in the rat's midbrain raphe nuclei and the locus coeruleus induced by acupuncture were studied with the fluorescence histochemical method. When the animals were subjected to electro-acupuncture, both the tail-flick and vocalization thresholds were elevated and the fluorescence intensity of the 5-hydro-xytryptamine (5-HT) in the NUC. raphe dorsalis and NUC. raphe medianus was increased markedly. The fluorescence of noradrenaline (NA) of the locus coeruleus did not show any significant change. The results indicate that the 5-HT neurones in the midbrain raphe nuclei undergo profound functional change in the process of acupuncture and imply that such neurones may play an important role in the effect of acupuncture.

/Continuation of SHENGWUHUAXUE YU SHENGWUWULI XUEBAO, No 2, Jun 78, pp 119-125/

Received 17 October 1977.

AUTHOR: None

ORG: Nucleic Acid Synthesis Group, Second Laboratory, Shanghai Institute of Biochemistry, Chinese Academy of Sciences

TITLE: "Studies on Polynucleotide Synthesis: I. Enzymic Synthesis of the Octanucleoside Heptaphosphate CpUpCpGpUpCpCpA Corresponding to the CCA-Stem Region of the 3'-End of Yeast Alanine Transfer Nucleic Acid"

SOURCE: Shanghai SHENGWUHUAXUE YU SHENGWUWULI XUEBAO /ACTA BIOCHEMICA ET BIOPHYSICA SINICA/ in Chinese, No 2, Jun 78, pp 127-141

TEXT OF ENGLISH ABSTRACT: The enzymic synthesis of the octanucleoside heptaphosphate CpUpCpGpUpCpCpA corresponding to the defined sequence of the CCA-stem region of 3'-end of yeast alanine transfer nucleic acid from CpUpCpG > p and UpCpCpA by ribonuclease N_1 from Neurospora crassa (E.C. 2.7. 7. 26) is described.

The reaction mixture which contained CpUpCpG > p (the donor), 0.07 to 0.09 M; UpCpCpA (the acceptor), 0.20 to 0.57 M; ribonuclease N_1, 250 units per milliliter and phosphate bufferr(pH 7.5), 0.1 M, was kept at 0°±2°C for 48 hours. The yields of CpUpCpGpUpCpCpA were found to increase with the increase of the ratio of the acceptor to the donor. When the ratio was raised to 6 to 7, the

/Continuation of SHENGWUHUAXUE YU SHENGWUWULI XUEBAO, No 2, Jun 78, pp 127-141/

yields of CpUpCpGpUpCpCpA reached 30 percent based upon the amount of CpUpCpG > p added. This method may be used for the preparation of milligram quantities of this oligonucleotide.

Incubation of the reaction mixture for 15 minutes at 37°C with 0.04 M dithiopropanol and 6 M ammonium hydroxide, completely inactivated ribonuclease N_1. However, once SH-inhibitor is removed, the inactivated enzyme would gradually recover most of its initial activity through oxidation by atmospheric oxygen. We have found, that either DEAE Sephadex A-25 (Cl-form) column chromatography at pH 3.5, or electrophoresis at pH2.7 may be employed to remove ribonuclease N_1 from the synthetic products.

Some di-, tetra- and heptanucleotides such as GpC, GpU, GpΨ, GpUp, GpUpCpC, CpUpCpGpUpCpC, etc., have been synthesized using ribonuclease N_1, all with relatively high yields. During the synthesis of CpUpCpGpUpCpCpA, certain byproducts have been separated, purified and identified.

Received 21 November 1977.

AUTHOR: None

ORG: Nucleic Acid Synthesis Group, Second Laboratory, Shanghai Institute of Biochemistry, Chinese Academy of Sciences

TITLE: "Studies on Polynucleotide Synthesis: II. Synthesis of CpUpCp, GpUp and CpUpCpGpUp"

SOURCE: Shanghai SHENGWUHUAXUE YU SHENGWUWULI XUEBAO /ACTA BIOCHEMICA ET BIOPHYSICA SINICA/ in Chinese, No 2, Jun 78, pp 143-155

TEXT OF ENGLISH ABSTRACT: In this communication we report the chemical synthesis of a pentanucleotide fragment, CpUpCpGpUp, which corresponds to the part of the 3'-terminal stem of yeast alanine tRNA. By condensing ${}_{HO}U(OBz)\text{-}p\text{-}NHC_6H_5$ with ${}_{MMT}G^{Ac}(OAc)\text{-}p$ or ${}_{MMT}G^{iBu}(OiBu)\text{-}p$ and deblocking the 5'-MMT protecting group, ${}_{HO}G^{Ac}(OAc)\text{-}p\text{-}U(OBz)\text{-}p\text{-}NHC_6H_5$ and ${}_{HO}G^{iBu}(OiBu)\text{-}p\text{-}U(OBz)\text{-}p\text{-}NHC_6H_5$ can be obtained. ${}_{Bz}C^{Bz}(OBz)\text{-}p\text{-}U(OBz)\text{-}p\text{-}C^{Bz}(OBz)\text{-}p$ is synthesized by condensing ${}_{Bz}C^{Bz}(OBz)\text{-}p\text{-}U(OBz)\text{-}p$, which, in turn, is prepared from ${}_{Bz}C^{Bz}(OBz)\text{-}p$ and

/Continuation of SHENGWUHUAXUE YU SHENGWUWULI XUEBAO, No 2, Jun 78, pp 143-155/

${}_{HO}U(OBz)\text{-}p\text{-}HNC_6H_5$, with ${}_{HO}C^{Bz}(OBz)\text{-}p\text{-}NHC_6H_5$ and deblocking the aniline group. Coupling such a protected trinucleoside triphosphate with ${}_{HO}G^{Ac}(OAc)\text{-}p\text{-}U(OBz)\text{-}p\text{-}NHC_6H_5$ and removing all protecting groups gives a crude product. After purification by column chromatography in 7 M urea, pure CpUpCpGpUp is obtained. This product is identified by means of paper electrophoresis, TEAE-thin layer chromatography, and can be completely digested with pancreatic RNase to give Cp, Up, GpUp in the correct ratio.

Received 4 November 1977.

AUTHOR: None

ORG: Nucleic Acid Synthesis Group, Second Laboratory, Shanghai Institute of Biochemistry, Chinese Academy of Sciences

TITLE: "Studies on Polynucleotide Synthesis: III. Synthesis of CpUpCpG>p"

SOURCE: Shanghai SHENGWUHUAXUE YU SHENGWUWULI XUEBAO [ACTA BIOCHEMICA ET BIOPHYSICA SINICA] in Chinese, No 2, Jun 78, pp 157-163

TEXT OF ENGLISH ABSTRACT: By means of the cooperated enzymic catalysis of E. coli polynucleotide phosphorylase and ribonuclease N_1 the tetranucleotide CpUpCpG>p is synthesized from CpUpC and GDP. The conditions of reaction are: 1. CpUpC:GDP = 1:5 (molar ratio), 2. RNase N_1:PNPase = 4:1 (activity unit ratio), 3. pH 7.6 and the incubation time of 10 hrs at 37°. The total yield is 82 percent of which 64 percent is CpUpCpG>p and 18 percent is the acyclic phosphate compound CpUpCpGp. The latter product, however, can be further cyclized to CpUpCpG>p (60 percent) by reaction with ethylchloroformate.

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AUTHOR: None

ORG: Nucleic Acid Synthesis Group, Second Laboratory, Shanghai Institute of Biochemistry, Chinese Academy of Sciences

TITLE: "Studies on Polynucleotide Synthesis: IV. Synthesis of UpCpCpA"

SOURCE: Shanghai SHENGWUHUAXUE YU SHENGWUWULI XUEBAO [ACTA BIOCHEMICA ET BIOPHYSICA SINICA] in Chinese, No 2, Jun 78, pp 165-173

TEXT OF ENGLISH ABSTRACT: The tetranucleoside triphosphate UpCpCpA has been synthesized by either the combined use of chemical and enzymic methods or chemical method alone. A schematic diagram is presented in Figure 1.

The UpCpCpA is synthesized with PNPase which catalyzes the single addition of the 2'(3')-O-(alpha-methoxyethyl)-ADP to the primer UpCpC. The yield is 30 percent. The problems of the isolation of reaction products and of the transnucleotidation are discussed.

Received 8 November 1977.

AUTHOR: None

ORG: Nucleic Acid Synthesis Group, Second Laboratory, Shanghai Institute of Biochemistry, Chinese Academy of Sciences

TITLE: "Studies on Polynucleotide Synthesis: V. Synthesis of GpCpm^{1}Ipψ"

SOURCE: Shanghai SHENGWUHUAXUE YU SHENGWUWULI XUEBAO [ACTA BIOCHEMICA ET BIOPHYSICA SINICA] in Chinese, No 2, Jun 78, pp 175-183

TEXT OF ENGLISH ABSTRACT: This paper describes the chemical synthesis of the tetranucleotide fragment, GpCpm^{1}Ipψ, which corresponds to the anticodon region of yeast alanine tRNA. By condensing in the order mentioned $_{HO}\psi^{Bz}(OBz)$-p, $_{MMT}C^{Bz}(OBz)$-p and $_{iBu}G^{iBu}(OiBu)$-p and removing all acyl protecting groups with methanolic ammonia, the crude tetranucleotide is obtained. Purification by column chromatography and paper electrophoresis yields the desired pure GpCpm^{1}Ipψ. It can be completely digested by pancreatic RNase to give GpCp and m^{1}Ipψ.

Received 4 November 1978.

AUTHOR: None

ORG: Nucleic Acid Synthesis Group, Second Laboratory, Shanghai Institute of Biochemistry, Chinese Academy of Sciences

TITLE: "Studies on Polynucleotide Synthesis: VI. Synthesis of Two Tetranucleotide Fragments in the Anticodon Region of the 5'-Half Molecule of Yeast Alanine tRNA"

SOURCE: Shanghai SHENGWUHUAXUE YU SHENGWUWULI XUEBAO [ACTA BIOCHEMICA ET BIOPHYSICA SINICA] in Chinese, No 2, Jun 78, pp 185-192

TEXT OF ENGLISH ABSTRACT: This paper describes the synthesis of CUCC and CUUI, two tetranucleoside triphosphate fragments in the anticodon region of yeast alanine tRNA. The CUCC is synthesized by condensation of $_{Bz}C^{Bz}(OB_z)$-p-U(OBz)-p with $_{HO}C^{Bz}(OBz)$-p-$C^{Bz}(OBz)_2$ and purified by column chromatography and paper electrophoresis. The CUUI fragment is synthesized by stepwise elongation starting from $_{HO}I^{Bz}(OBz)_2$ or by condensation of $_{Bz}C^{Bz}(OBz)$-p-U(OBz)-p with $_{HO}U(OBz)$-p-$I^{Bz}(OBz)_2$. The condensation reagent is dicyclohexyl carbodiimide. Both CUCC

/Continuation of SHENGWUHUAXUE YU SHENGWUWULI XUEBAO, No 2, Jun 78, pp 185-192/

and CUUI can be completely digested by pancreatic RNase to give the correct nucleotide proportions.

HE Guizhen /0149 2710 3791/ and ZHANG Pingping /1728 5493 5493/, students of Department of Biology, Fudan University, provided major contents of the article.

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AUTHOR: None

ORG: Nucleic Acid Synthesis Group, Second Laboratory, Shanghai Institute of Biochemistry, Chinese Academy of Sciences

TITLE: "Studies on Polynucleotide Synthesis: VII. Synthesis of Hexadecanucleotide (CUCHCCACUCGUCCA) With RNA Ligase"

SOURCE: Shanghai SHENGWUHUAXUE YU SHENGWUWULI XUEBAO /ACTA BIOCHEMICA ET BIOPHYSICA SINICA/ in Chinese, No 2, Jun 78, pp 193-198

TEXT OF ENGLISH ABSTRACT: Octanucleotide ^{32}pCUCGHCCA (donor), was reacted with another octanucleotide, CUCGUCCA (acceptor), under the catalytic action of RNA ligase to obtain a single intermolecular product of hexadecanucleotide, CUCGUCCA^{32}pCUCGUCCA, the ratio of donor to acceptor being 1:50.

The product of reaction was separated on Sephadex G-75 and the separated product was identified by its resistance to alkaline phosphatase, its thin layer homochromatographic behavior on DEAE-microcrystalline cellulose, and the appearance of the expected radiolabeled product on alkaline hydrolysis for nearest neighbor frequency analysis.

The yields were in the range of 50 to 70 percent.

It is expected that RNA ligase will be useful for the synthesis of RNA fragments of defined sequence.

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AUTHOR: ZHU Shangquan [2612 1424 2939]
LI Tongfen [2621 2717 5358]
CAO Qiuping [2580 4428 1627]

ORG: All of Shanghai Institute of Biochemistry, Chinese Academy of Sciences

TITLE: "B_{22} Arginine Is Not Essential for Insulin Activity"

SOURCE: Shanghai SHENGWUHUAXUE YU SHENGWUWULI XUEBAO [ACTA BIOCHEMICA ET BIOPHYSICA SINICA] in Chinese, No 2, Jun 78, pp 199-202

TEXT OF ENGLISH ABSTRACT: Insulin hexamethyl ester was digested by trypsin and carboxypeptidase B. Desnonapeptide (B_{22-30})-insulin pentamethyl ester ($\overset{OMe}{DNIOH}$) was obtained. Then two N-terminal amino groups of $\overset{OMe}{DNIOH}$ were protected with the BOC group. The resulting N,N'-di-BOC desnonapeptide (B_{22-30}) insulin peptamethyl ester was coupled with X-D-Ala-PheOMe(X=Arg, D-Arg, Gly, $\overset{BOC}{Lys}$ or $\overset{OTB}{Asp}$). After removal of all protecting groups, D-Ala^{B23}-des-hexapeptide (B_{25-30}) insulin (D-Ala^{B23}-DHI) and its analogs with variation in B_{22} could be obtained.

[Continuation of SHENGWUHUAXUE YU SHENGWUWULI XUEBAO, No 2, Jun 78, pp 199-202]

Biological activity of these analogs shows that Arg^{B22} can be replaced by Lys or Asp. The results indicate that Arg^{B22} is not essential for insulin activity. However, when Arg^{B22} was substituted by D-Arg or Gly, their activities were very low.

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10424
CSO: 4009

AUTHOR: None

ORG: Nucleic Acids Research Group, Third Laboratory, Shanghai Institute of Cell Biology, Chinese Academy of Sciences

TITLE: "Synthesis and Studies of Polynucleotides: I. Chemical Synthesis of the Decadeoxyribonucleotide"

SOURCE: Shanghai SHENGWUHUAXUE YU SHENGWUWULI XUEBAO /ACTA BIOCHEMICA ET BIOPHYSICA SINICA/ in Chinese, No 3, Sep 78, pp 203-216

TEXT OF ENGLISH ABSTRACT: A decadeoxyribonnecleotide, $d\text{-}_{MMTr}C^{Bz}{}_{p}A^{Bz}{}_{p}C^{An}{}_{p}G^{Bz}{}_{p}A^{Bz}{}_{p}G^{Bz}{}_{p}T{}_{p}C^{An}{}_{p}C^{An}{}_{p}G^{Bz}$, was synthesized chemically by condensation of preformed oligonucleotide blocks. After removal of all the protecting groups, each intermediate and final product were completely hydrolysed by the phosphodiesterase P1 from Penicillium citrium and gave the expected base ratio for that product.

A trityl-cellulose column was used for the separation of trityl compounds from non-trityl compounds in the reaction mixture. Further separation on DEAE-cellulose was thus rendered simpler and easier.

/Continuation of SHENGWUHUAXUE YU SHENGWUWULI XUEBAO, No 3, Sep 78, pp 203-216/

Received 17 January 1978.

AUTHOR: None

ORG: Nucleic Acids Research Group, Third Laboratory, Shanghai Institute of Cell Biology, Chinese Academy of Sciences

TITLE: "Synthesis and Studies of Polynucleotides: II. Chemical Synthesis of Hexadeoxyribonucleotide and Their Separations by Solvent Extraction"

SOURCE: Shanghai SHENGWUHUAXUE YU SHENGWUWULI XUEBAO /ACTA BIOCHEMICA ET BIOPHYSICA SINICA/ in Chinese, No 3, Sep 78, pp 217-234

TEXT OF ENGLISH ABSTRACT: Using mesitylene sulfonyl chloride (MS) as cindensing agent, two protected hexadeoxyribonucleotides, d-${}_{MMTr}G^{Bz}{}_{p}A^{Bz}{}_{p}C^{An}{}_{p}G^{Bz}{}_{p}A^{Bz}{}_{p}G^{Bz}$ and d-${}_{MMTr}T_{p}C^{An}{}_{p}G^{Bz}{}_{p}A^{Bz}{}_{p}A^{Bz}{}_{p}C^{An}$, were synthesized. After removing the protecting groups, the nucleotide sequences determined by two dimensional homochromatography agreed well with the design, being d-GpApCpGpApG and d-TpCpGpApApC, respectively. Only solvent-extraction was used for the separation of the intermediate products of protected oligonucleotides in every condensation step. The separation procedure was thus simplified and the separation time shortened to a large extent. This method is now adopted for the preparation of protected oligonucleotides on a large scale, irrespective of whether the trityl containing group is on the 5'-

/Continuation of SHENGWUHUAXUE YU SHENGWUWULI XUEBAO, No 3, Sep 78, pp 217-234/

or the 3'-end (for example, in d-${}_{p}G^{Bz}{}_{p}A^{Bz}{}_{\text{-ODMTr}}$).

Received 17 January 1978.

AUTHOR: None

ORG: Nucleic Acids Research Group, Third Laboratory, Shanghai Institute of Cell Biology, Chinese Academy of Sciences

TITLE: "Synthesis and Studies of Polynucleotides: III. Chemical Synthesis of a Tridecadeoxyribonucleotide"

SOURCE: Shanghai SHENGWUHUAXUE YU SHENGWUWULI XUEBAO /ACTA BIOCHEMICA ET BIOPHYSICA SINICA/ in Chinese, No 3, Sep 78, pp 235-256

TEXT OF ENGLISH ABSTRACT: Using mesitylene sulfonyl chloride (MS) as condensing agent, the protected tridecadeoxyribonucleotide, d-${}_{MMTr}G^{Bz}{}_{p}A^{Bz}{}_{p}C^{An}{}_{p}G^{Bz}{}_{p}A^{Bz}{}_{p}G^{Bz}{}_{p}T{}_{p}C^{An}{}_{p}C^{An}{}_{p}G^{Bz}{}_{p}G^{Bz}{}_{p}A^{Bz}{}_{p}A^{Bz}$, was synthesized chemically, starting from the protected hexadeoxyribonucleotide, d-${}_{MMTr}G^{Bz}{}_{p}A^{Bz}{}_{p}C^{An}{}_{p}G^{Bz}{}_{p}A^{Bz}{}_{p}G^{Bz}$ by two successive condensations with the protected trinucleotide. d-${}_{p}T{}_{p}C^{An}{}_{p}C^{An}{}_{-OAc}$, and the protected tetranucleotide, d-${}_{p}G^{Bz}{}_{p}G^{Bz}{}_{p}A^{Bz}{}_{p}A^{Bz}{}_{-OAc}$. After removing the protecting groups, the tridecadeoxyribonucleotide, d-GpApCpGpApGpTpCpCpGpGpApA, was purified and identified by

/Continuation of SHENGWUHUAXUE YU SHENGWUWULI XUEBAO, No 3, Sep 78, pp 235-256/

DEAE-Sephadex A-25 chromatography in 7M urea at 65°C. However, the separations on DEAE-cellulose of the protected oligonucleotides from the two stepwide block condensations were difficult because the intermediate products carrying a large number of aryl protecting groups were adsorbed strongly on to the ion-exchange resin. This difficulty can be overcome by separation on a DEAE-sephadex A-25 (Cl-form) column instead of a DEAE-cellulose column, followed by elution with lithium chloride solution containing 3M urea and 40% ethanol.

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AUTHOR: YAO Peilong /1202 7378 7893/
LIU Huizhon /0491 1920 3791/
YU Yujuan /0151 3768 1227/

ORG: All of Nucleic Acids Research Group, Third Laboratory, Shanghai Institute of Cell Biology, Chinese Academy of Sciences

TITLE: "Synthesis and Studies of Polynucleotides: IV. Chemical Synthesis of d-$_p$CpCpCpA By a Modified Phosphodiester Method"

SOURCE: Shanghai SHENGWUHUAXUE YU SHENGWUWULI XUEBAO /ACTA BIOCHEMICA ET BIOPHYSICA SINICA/ in Chinese, No 3, Sep 78, pp 257-267

TEXT OF ENGLISH ABSTRACT: By a modified phosphodiester method several oligodeoxyribonucleotides (d-$_p$C$_p$C, d-$_p$C$_p$C$_p$C, d-$_p$C$_p$C$_p$C$_p$A) were synthesized chemically.

The main points of the modification are: (1) deprotection of all the protecting groups in order to overcome difficulties encountered in the isolation of oligonucleotides on column chromatography, due chiefly to the lipophilic properties of the protecting groups. (2) The appropriate reprotection of the desired oligonucleotides necessary for the next condensation to avoid the unexpected loss of the protecting groups that might have occurred in the previous operations of the phosphodiester method. Thus the yields of the obtained oligonucleotides

/Continuation of SHENGWUHUAXUE YU SHENGWUWULI XUEBAO, No 3, Sep 78, pp 257-267/

are increased and the purities improved.

Although the present modification has only been applied to the synthesis of short oligonucleotides, it may provide an alternate approach to the chemical condensation of two short natural segments of DNA through the formation of the 3'-5' phosphodiester bond.

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AUTHOR: None

ORG: Nucleic Acid Synthesis Group, Second Laboratory, Shanghai Institute of Biochemistry, Chinese Academy of Sciences

TITLE: "Synthesis of Methyl Vinyl Ether and 2'(3')-O-Methoxyethyl-Nucleoside-5'-Diphosphates"

SOURCE: Shanghai SHENGWUHUAXUE YU SHENGWUWULI XUEBAO [ACTA BIOCHEMICA ET BIOPHYSICA SINICA] in Chinese, No 3, Sep 78, pp 269-278

TEXT OF ENGLISH ABSTRACT: I. A simple and easy method for preparing methyl vinyl ether (MVE) is described. It consists of three reaction steps:

1) $CH_3CHO + CH_3OH + HCl \xrightarrow[-20^\circ C]{} CH_3OCH(Cl)CH_3 + H_2O$

2) $CH_3OCH(Cl)CH_3 + C_5H_5N \xrightarrow[-20^\circ C]{} [CH_3OCH(Cl)CH_3 \cdot C_5H_5N]$

3) $[CH_3OCH(Cl)CH_3 \cdot C_5H_5N] \xrightarrow[120^\circ C]{} CH_3OCH{=}CH_2 + C_8H_5N \cdot HCl$

II. The 2'(3')-O-methoxyethyl-5'-diphosphoryladenosine, -guanosine, -cytidine, -uridine and -pseudouridine have been synthesized by the reaction of the respective nucleoside-5'-diphosphate and MVE catalyzed by trifluoroacetic acid.

[Continuation of SHENGWUHUAXUE YU SHENGWUWULI XUEBAO, No 3, Sep 78, pp 269-278]

The yield of the above nucleoside derivatives are around 50 to 70%.

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AUTHOR: LU Yixin /7120 0110 0207/
LI Diyuan /2621 6611 0337/
CHEN Xianmiao /7115 6343 1181/
ZHAO Guangsheng /6392 0342 0524/
CHANG Yuming /1603 1937 2494/
XU Ruiji /6079 3843 0679/

ORG: LU, LI, CHEN and ZHAO of Biochemistry Section, Shanghai Hypertension Research Institute; CHANG and XU of Biochemistry Section, General Hospital, Nanjing Unit, People's Liberation Army

TITLE: "Direct Measurement of Human Plasma Angiotensin II by Radioimmunoassay"

SOURCE: Shanghai SHENGWUHUAXUE YU SHENGWUWULI XUEBAO /ACTA BIOCHEMICA ET BIOPHYSICA SINICA/ in Chinese, No 3, Sep 78, pp 279-291

TEXT OF ENGLISH ABSTRACT: The direction detection of plasma angiotension II (AT II) by radioimmunoassay with 0.5 ml of human blood waa achieved by utilizing fine-quality antisera, ^{125}I. AT II of high specific activity and the double antisera separation technique.

The detecting limit for competitive inhibition curve ($n = 28$) was 3.6±1.6 pg (m.±S.D.), and the precision was 4.7±1.4% (m.±S.D.).

/Continuation of SHENGWUHUAXUE YU SHENGWUWULI XUEBAO, No 3, Sep 78, pp 279-291/

The C. V. in plasma measurement were 7 to 14 percent for the within assay, and 8.7 to 18 percent for the between assays respectively.

AT II showed a linear increase concomittantly with the increment of the plasma from 0.1 to 1.5 ml.

AT II added into the plasma could be quantitatively recovered (97 to 117 %).

There was no evidence of interference by the addition of eight peptide hormones, human plasma proteins, proteolytic enzymes and enzyme inhibitors.

The mean concentrations of the peripheral venous plasma AT II of normal persons on free diet were as follows: 26±10 pg/ml ($n=54$) while assuming a recumbent position for 1.5 hours, with a negative correlation to 24 hours urinary sodium exeretion ($p<0.01$); 46±22 pg/ml ($n=17$) after assuming an erect position for 2 hours.

The plasma AT II values were markedly elevated after provocation either with a low sodium diet or an intramuscular injection of furosemide ($p<0.01$).

As a sensitive, specific, accurate and simple method for the detection of minute quantities of plasma AT II, this method should be useful for clinical investigations and for research on the renin-angiotensin system.

Thanks are due the Polypeptide Hormone Section, Institute of Biochemistry, Chinese Academy of Sciences for guidance an purification and determination of $ATII_a$. Received 27 September 1977.

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CSO: 4009

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